January 1987

COMPACT disc Interactive

CD-I NEWS

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HIGHLIGHTS

- **Many leading Japanese companies** are closely examining the CD-I market. Hitachi has already demonstrated a CD-I prototype player. The views and plans of nine leading Japanese consumer electronics manufacturers in CD-I are outlined. (p. 1)
- **Sony's audio bit rate reduction system for CD-I** that offers greater compression of the audio signal is described. (p. 3)
- **Tom Lopez, Vice President of the CD-ROM division at Microsoft,** sees CD-I as a potentially viable consumer product, and stresses the importance of demonstrating real CD-I players. (p. 6)
- **The video specifications of CD-I** are presented. Objections to the CD-I standard utilizing 16-bit technology are raised. (p. 9)
- **ICT** discusses its maketing research and production activities in CD-I. (p. 10)
- **Programmers are forging ahead with CD-I** despite the present lack of real authoring tools. Examples of authoring tools for CD-I simulations are discussed. (p. 11)

CD-I in Japan

Japan's CD-I market, like that in the rest of the world, is still in its infancy. Most of the major consumer electronics manufacturers there are assessing both the technology and its market potential.

In this issue, ***CD-I News*** provides a status report on nine leading Japanese companies currently involved with this digital technology and their position on the future of CD-I.

Philips Kogyo Shinko and Hitatchi are setting the pace with CD-I development in Japan. Hitachi began testing a CD-I prototype system in September 1986 in cooperation with Shingakusha of Kyoiku Shuppansha. Philips Kogyo Shinko is following the lead set by its Dutch parent, the manufacturer most committed to CD-I. Some of the key factors spurring other vendors to consider entry into the CD-I market include the success of CD-Audio and the likely use of CD technology in vehicle navigation by 1990.

However, many likely CD-I vendors — most notably Sony — are holding back from making a significant commitment to CD-I. Part

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CD-I/Green Book Information in U.S.A.

Inquiries on CD-I and the Green Book specifications in the U.S.A. may be addressed to:

Bert Gall
Philips U.S. Liaison Office for CD-I
Box 204
1111 Northshore Drive
Knoxville, TN 37919

Gall is responsible for product management and support for CD-I at Philips in the U.S.A. Gall also carries the title of U.S. liaision and information officer for CD-I for Philips, which involves maintaining industrial contacts with CD-I licensees. In addition, Gall is the U.S. acting representative of Philips' New Media Information Center. ⊡

Correction

In the first issue of ***CD-I News***, the article on the High Sierra Group incorrectly stated that CD-I discs could be read by most CD-ROM players. In fact, CD-I discs can't be read by CD-ROM players.

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The editors of ***CD-I News*** welcome letters to the editor, submissions for opinion pieces, clippings of interesting articles, news tips, and any relevant information about this new industry.

Please mail your letters, comments, and suggestions to:

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In Forthcoming Issues

- **Hitachi's CD-I plans.**
- **CD-I adoption** scenarios.
- **CD-I in education.**
- **Interview with Jim Levy** of Activision.
- **CD-I production** techniques.
- **Bank Street College's** CD-I Projects.
- **Conference Highlights:** Optical Information Systems '86, CD-I: Birth of a Billion Dollar Industry, and others.

LINK Resources acknowledges the financial support of N.V. Philips and other companies involved in this emerging industry in the introduction of ***CD-I News***, and invites additional corporate sponsorship.

Annual individual subscription for 12 issues is $195, or the equivalent in your local currency at the time of invoicing.

NEWS

Sony's CD-I Audio System

Sony presented the technical specifications of its audio bit rate reduction system for CD-I at the 81st Convention of the Audio Engineering Society in Los Angeles in November 1986.

CD-I is designed to provide four distinct audio quality levels: LP record quality, FM radio quality, AM radio quality and better-than-telephone quality.

In order to realize the CD-I format, audio data needs to be compressed without perceptible degradation or reduction of the error-concealment capability. Sony has developed an algorithm of the bit rate reduction system and built an encoder using DSP and a dedicated decoder LSI.

Sony's bit rate reduction system provides multiple prediction filters in order to respond effectively to fluctuations in the frequency distribution of the signal. The system also employs near-instantaneous companding to expand the dynamic range.

The Sony paper on its audio bit reduction system for CD-I is available from:

Audio Engineering Society
60 East 42nd Street
New York, NY 10165
U.S.A.

Apples and Oranges: Apple Takes on AIM, Slams CD-I At IIA Conference

"We don't see CD-I as a standard at all"

The controversy between the CD-ROM and CD-I camps continues. The latest furor erupted at a session at the Information Industry Association's annual conference in New York City, where Mike Liebhold, Manager of Optical Media Applications at Apple Computer, questioned the viability of Compact Disc-Interactive. Ray Ashton, Vice President for program development at American Interactive Media, came to the technology's defense.

"We don't see CD-I as a standard at all," Liebhold said. "[CD-I] is a particular, specific application of CD-ROM."

Liebhold was especially critical of the 68070 processor specified in the CD-I standard developed by Sony and N.V. Philips. *[Editor's note: the 68000 family is specified for CD-I, not the 68070.]* The 68070, he said, is "not transportable," not compatible with anything else, and "not extensible."

"It may be too narrow for Apple to support," Liebhold said. He decried the CD-I specifications as "not necessarily a growth path," but one that would require "a great deal of engineering to be extensible."

Liebhold was also highly critical of CD-I's video capability, saying that it "really doesn't support [full-motion, full-screen] video" — a shortcoming which he said was "particularly important when evaluating multimedia."

The cause of Liebhold's distaste for CD-I became clear in the last portion of his presentation: Apple would much rather promote its upgraded Apple II, the Apple IIGS, with an SCSI interface, graphics, sound, and "compatibility with 10,000 [existing Apple II] software titles." The GS sound chip, according to Liebhold, "compares very well with the CD-I sound chip."

"We're hot," he concluded. "So c'mon let's do it." Ray Ashton of AIM, was hot too — because of Liebhold's denunciation of CD-I. During the question and answer session, ***CD-I News*** asked for his response to the Apple claim about CD-I.

(continued on page 4)

NEWS

ASCENT to CD-I

ASCENT believes that interactive videodiscs, CD-ROM, and CD-I have great potential in education

ASCENT (Albany Symposium on Cognition, Education, and New Technologies), a new educational group composed primarily of educators from the State University of New York at Albany, has been formed to study how such new communications technologies as CD-I, CD-ROM, and videodiscs can be used to enhance and support education. ASCENT is working closely with several N.Y. State agencies and educational centers on this project.

According to Ray Ortali, ASCENT's Chairman, the group believes that videodiscs, CD-ROM, and CD-I have great potential in education. However, the group believes these technologies will only work in education if educators and technical people have a sufficient understanding of each other's roles with these technologies. A complete description of ASCENT's plans can be found in a short paper called "An Invitation to Educators and the Information Industry." The paper is accompanied by a questionnaire for educators and academic researchers that will be used in the Electronic Scholar's Resource Guide, a book being assembled by Joe Raben for publication in 1987.

The guide will also be available in online form, and possibly on CD-ROM or CD-I.

ASCENT's two main functions are to gather information on new communications technologies and to match individual companies working on these technologies with scholars, administrators, librarians, publishers and others utilizing those technologies. ASCENT plans to organize seminars and conferences and produce publications in both print and electronic media. One of ASCENT's first activities was co-sponsoring the education sessions at the LaserActive '86 Conference in Boston in November 1986.

For further information on ASCENT, contact:

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Albany, NY 12222
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Apples and Oranges ... (continued from page 3)

They are "totally distinct, different products," Ashton said. He proceeded to cite the strengths of the CD-I technology in comparison to Apple products: processing power which "exceeds the Mac," equivalent storage and clock speed, and even an RS-232 port.

"I can wire it [the CD-I player] and slow it down," Ashton said with more than a trace of sarcasm. "I'd much rather have real sound [than the computer-generated sound of the Apple IIGS]." As for video: "I'll window it" on a CD-I disc — with 72 minutes of digital video possible in a "windowed format."

The dispute between Apple and AIM, in our view, was clearly a case of apples and oranges. Apple, with roots in the world of personal computing, envisions a world of cacophonous bells and whistles added at the whim of the individual user; AIM, on the other hand, emanates from the world of consumer electronics, where non-extensible "boxes" — television sets, stereos, tape players — have generated billions of dollars of hardware and software sales. ⊡

WORLD REPORT

The BBC Domesday Project

The Domesday Project provides an excellent example of the type of programming that could work well on CD-I

At a November 1986 conference sponsored by the European Commission in Luxembourg, 400 delegates were enchanted by a video presentation of the BBC's Domesday Project. The Domesday Project commemorates the 900th anniversary of the "Domesday Book," compiled on the orders of King William I. However, instead of parchment, the 1986 version uses LV-ROM technology, which incorporates digital data on a LaserVision disc. The disc provides an excellent example of the type of programming that could work well on CD-I, especially since LV-ROM has many of the same capabilities CD-I has.

The scale of the Domesday Project is immense, involving a budget of $5 million and over 22,000 man years effort. The disc's software and file structures were designed from scratch by Logica. The database for the project is contained on two discs, a National and a Community disc.

The National Disc contains textual and visual material on a wide range of subjects, including detailed statistical information from government organizations, private research groups, and universities; 1,500 articles from newspapers and magazines; extracts from Hansard and other specialist sources; and specially commissioned essays. In addition, the disc provides data on local amenities including shops, post offices, banks, and pubs.

In all there are about 9,000 sets of data on the National Disc. They have been selected with the guidance of an editorial board of professional researchers from major national bodies, including National Data Archive at the University of Essex; the Centre for Urban and Regional Development Studies at Newcastle; the Institute of Terrestrial Ecology; and Birkbeck College, London University.

The main results of the 1981 Population Census are included, together with Government surveys such as the General Household Survey, the Family Expenditure Survey, extracts from the annual Social Trends and many others such as the BBC's own "Daily Life in the 1980s." In addition, there are data from Ordnance Survey, environmental institutions and key economic and financial sources.

The four main subject areas can be accessed by keywords:

- **Culture:** Arts, language, religion, customs, fashion, media
- **Economy:** Personal finance, national economy, prices, consumption
- **Society:** Education, health, defense, housing, people, transport
- **Environment:** Conservation, climate, landscape, wildlife, pollution

Another major feature of the disc is its ability to calculate areas and distances, and to present a range of user-defined pictorial representations, which can be overlayed on the video display. In addition to 50,000 pictures, the disc uses many video sequences of British events from 1980 to 1986.

The Community Disc is based on 24,000 Ordnance Survey maps covering the entire United Kingdom at four different scales, along with street plans for major cities and floor plans for specially-selected buildings. The disc also uses 900 aerial photographs and 500 specially taken satellite pictures.

The disc's first display on the screen is a map of the whole United Kingdom. By means of a trackerball which moves a pointer over the screen, users can move around the country selecting from the choice of different-scaled Ordnance Survey maps. Information and photographs of each of the 1/4 million place-names of the gazetteer can be accessed by simply typing in its name or grid-reference, or any particular topic can be explored by entering keywords, as on the National Disc.

The maps are supplemented by photographs and text at all levels. The most original data on the disc consists of material compiled by 14,000 schools and numerous community groups throughout the country in the recently publicized Domesday survey.

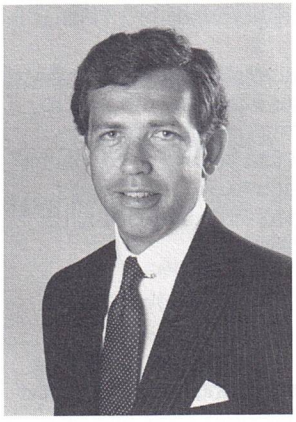
The system hardware consists of a front-loading LV-ROM player specially developed by Philips, a BBC Master Series micro-computer with a Videodisc Filing System (VFS), LV-ROM interface and a trackerball (mouse) control. The complete system retails for under $6,000, with the discs themselves priced at around $400 a set.

The BBC is now examining other projects that could utilize the LV-ROM technology, such as an ecology database drawing on its natural history expertise. ◻

INTERVIEW

TOM LOPEZ,

Interviewed by David Rosen



"... We're very excited about this technology"

LINK: Could you describe your position at Microsoft and your background?

LOPEZ: I am Vice President of the CD-ROM division of Microsoft Corporation. Our division was formed about a year ago to explore the area of CD-ROM software and manage Microsoft's CD-ROM activities. I come from the consumer software business, and worked at Activision as Senior Vice President of editorial development. During my three years at Activision, I was responsible for the development of about two hundred products. Subsequent to my tenure at Activision, I formed Cytation Incorporated in San Francisco. Cytation was one of the first CD-ROM application developers in the country and I got involved with Microsoft and Bill Gates through these activities. In January of 1986, Microsoft acquired Cytation and I moved to Bellevue, Washington to assume my current position.

LINK: What is Microsoft doing with regard to MS-DOS extensions for CD-ROM?

TL: As you know, Microsoft's current strength is in system software tools and applications. This division's activities in CD-ROM really mirror the activity of Microsoft as a whole. Our recently announced MS-DOS extension for CD-ROM provides an interface between the MS-DOS standard and CD-ROM. With this extension, users of MS-DOS systems can use their CD-ROM drives very much the same way they would use their floppy or hard disc drives for various applications.

LINK: How has the CD-ROM industry responded to this development?

TL: Very positively. It's being licensed to drive manufacturers. When they offer CD-ROM drives as a peripheral, they can include a piece of software to make their CD-ROM drive subsystem integrate properly with MS-DOS. We've had a very good response to it and already have licensees for the software.

LINK: Would you be in a position to name any of these licensees?

TL: It's up to them to make their own announcement. That's their prerogative.

LINK: Going one step further, it's my understanding that Microsoft views CD-I as a subset of CD-ROM.

TL: Technically, everything evolves from the Red Book for Compact Disc-Digital Audio. If you look at the way audio is laid out, the 72 minutes of audio translates into a three-mile-long spiral of information on a CD. If you take that same disc and break up each minute into seconds and, in turn, the seconds into blocks of 2 kilobytes each, and add some error-correction, you've pretty much got CD-ROM. Thus, CD-ROM is a direct outgrowth of Digital Audio. CD-I takes that same data structure with a Mode Two in the Yellow Book, and adds on video, audio, and synchronization standards among other things. I see the base medium as the Compact Disc. CD-ROM adds to the Compact Disc another format, thus allowing data to be recorded and retrieved instead of music. CD-I further adds to that a standard for video and audio synchronization.

LINK: What you're saying is that the debate on the differences between CD-I and CD-ROM may be just two different universes of application. Both are essentially extensions from the CD-Digital Audio format.

TL: That's correct. I see CD-I as a further extension of CD-ROM.

LINK: How do you assess CD-I's chances as a product? Specifically, first what do you see occurring with the creation of original software? Secondly, how do you feel consumers will respond to interactive products?

TL: I think that the first question concerns the viability of CD-I, and we're very excited about

Vice President, Microsoft Corporation

this technology. We see it as a consumer market product with a world standard, and that's obviously a big plus for us. We feel that CD-I has many very good capabilities. Two elements are going to be critical to its success. First is the availability of appropriate authoring tools for developing applications. Without the authoring tools, the cost of developing good CD-I product will be prohibitive. Secondly, the software developers have to be encouraged to produce exciting programs with the authoring tools.

LINK: This highlights one important difference between CD-I and CD-Digital Audio — the absence of a library of existing programs for CD-I.

TL: Yes, but I don't think all CD-I programs need to be totally original. I feel that there is an opportunity to create a lot of what I call "transfer products" for CD-I. We can adapt products from other media for CD-I. One example would be producing a music video with still pictures.

"I feel there is an opportunity to create a lot of what I call 'transfer products' for CD-I"

LINK: Can you suggest other types of "transfer products"?

TL: They're really going to depend upon the creativity of the people in our business. Other types of "transfer products" would include computer programs developed for CD-I media by adding pictures and sound to data.

LINK: Will the lack of full-motion video impose creative limits on CD-I programming?

TL: I think that CD-I really has no creative limits. The capability of the medium is very strong. I don't feel that full-motion video is essential in delivering a powerful product. The more important issue is getting very creative people to develop applications that harness the medium. It's going to take some time.

LINK: What is Microsoft's position in the creative applications area? Are you looking to work with content providers to create the product outside of the MS-DOS framework?

TL: Oh yes, we are very interested in exploring this technology and working with content providers in establishing a whole new category of products. The really great thing about CD-I programs is that they will not look like anything you've ever seen before. It's hard to describe something that you don't have the appropriate language for because you've never seen it. It's like describing a movie to a blind person.

LINK: What role will CD-I have at the Microsoft '87 conference and how do you assess reactions to CD-I since last year's announcements?

TL: I think 1985 was the year technologists were hearing more about CD-ROM. With further exploration of the technology, CD-ROM became an established product in 1986. At the 1987 conference, the same kind of capability needs to be demonstrated with CD-I by Philips and Sony. In 1987, it's important for developers to get their hands on the CD-I prototype machines and run benchmarks. Only then can we say that CD-I is for real. So far everybody has seen nice slide shows and that sort of thing. It's time for people to really experience this new technology.

LINK: Do you think that if CD-I rolls out by 1988, it will have a noticeable impact on the CD-ROM market?

TL: I see CD-I as a companion to CD-ROM. I see CD-ROM as a computer peripheral or an integral part of a computer just like a hard disc. When the hard disc first came out, it was a peripheral, and then we saw machines with hard disks built into them. I would expect that CD-ROM will go in the same direction. You'll see CD-ROM in the office and in many places where you see personal computers today. But CD-I is a consumer product. One major distinction is that CD-I is designed to work best with a television set. This may lead to other applications in the home, with CD-I becoming a part of other home electronic products. ⊡

CD-I in Japan ... (continued from page 1)

of their reluctance to pursue CD-I now is due to their interest in pushing CD-ROM first.

The following table provides information on the current status and market outlook on CD-I by nine leading Japanese companies. ◘

Company	Comments and Plans in CD-I
Sony	The company has a strong commitment to CD-ROM. CD-I should take hold in both the audio and computer software industries due to its wide range of possible applications and eventual lower cost.
Optical Memory Systems	The company's involvement in CD-I is inevitable. Extensive demand for this medium should develop in the private sector.
Dai Nippon Printing	Rates CD-I highly due to its ability to provide text, video and audio data. Plans to aggressively pursue the medium in the future.
Toshiba EMI	As CD-ROM becomes increasingly used in business, CD-I should become popular in the consumer sector. With its capacity to carry audio, video, and data, CD-I should grow in the education and games markets. CD-I applications in vehicle navigation are four to five years in the future.
Nihon Columbia	Expects to see practical applications of CD-I after the fall of 1987. CD-I offers more than CD-ROM , but consumer response to CD-I depends on the availability of good software. Anticipates a large demand for CD-I vehicle navigation systems, and is aggressively proceeding with plans in that area.
Victor of Japan	CD-ROM has become increasing popular in business. Expects CD-I to achieve the same popularity in the consumer market. Doesn't consider CD-I research particularly necessary. Sees CD-I applications in vehicle navigation appearing two years after the introduction of the first CD-I systems.
Hitachi, Ltd.	Began testing a CD-I prototype player at the end of September in cooperation with Shingakusha of Kyoiku Shuppansha. Demonstrated a CD-I prototype disc with plant pictures.
Philips Kogyo Shinko	Placing great emphasis on CD-I. CD-I development will most likely follow the growth path of the CD-ROM market.
Matsushita Electric Industrial Co., Ltd.	Presently involved with CD-I chip and system development.

Source: ***"Japanese CD-ROM Market: Today and Tomorrow," Seed Publications***

INDUSTRY UPDATE

Video On CD-I: What It Can and Can't Do

An early industry myth is that Compact Disc-Interactive cannot accomodate full-motion video. Not true. CD-I can't accommodate full-screen, full-motion video, but it can handle partial-screen (one-tenth of the area) full-motion video for up to 72 minutes per disc.

From a technical standpoint, because the video image is made up of lots of data — and must be replenished so frequently — the inherent problem with digital video is that it requires a large amount of bandwidth. Compact Disc-Interactive applications will be limited by the transfer rate of data from the CD-I player. John Preston, manager of the New Media Information Center, Philips Corporate Group Home Interactive Systems, explains CD-I's full-motion video capability:

"The limitation [for video on CD-I] is purely the data rate from the screen"

It will take a CD-I player six tenths of a second to fill the screen with an image that consists of 108 kilobytes of data. The transfer rate for the CD-I player is 175 kilobytes. Therefore, it you take one-tenth of the screen — one-third of the horizontal and one-third of the vertical — it will take 17.5 pictures per second, using 108 kilobytes, to create a full-motion video image. (Home movies, for example, take up 16 pictures per second.) Think of it as the window of a building or the periscope on a submarine.

Providing graphics — like cartoons — requires much less information, and the transfer rate is completely adequate for those applications — and for graphics in computer applications, where you might have a still backdrop with pointers and other things moving on the screen.

The limitation [for video on CD-I] is purely the data rate from the screen.

Shiraz Shivji, Vice President for advanced technology at Atari, whose featured machine is now the 32-bit Amiga, stresses that CD-I has severe limitations in full-motion video:

To do digital video you need a lot of data. CD-I is frozen into 16-bit technology. The choice of the [Motorola] 68070 processor is not a good choice from the bandwidth standpoint. The most important thing [in video on CD-I] is bus bandwidth. I think you need to have at least 32-bit for a wider [data] path ... You need to have computing power and a full shot at the screen memory. The 16-bit-wide data path is not enough. The 32-bit processors are here and they're going down in price real fast.

Why do we care about CD-I? Because Atari has 25 million of our little things [videogame players and home computers] out there that hook up to a TV set.

To get the Philips side of the 32-bit/16-bit issue of video on CD-I, ***CD-I News*** turned to Bert Gall, U.S. CD-I product manager for Philips HIS in Knoxville, Tennessee:

I'm really surprised by what he [Shiraz Shivji of Atari] says. The limiting factor [for video in CD-I] is not the microprocessor — the microprocessor can do everything you need it to do. The limiting factor is the data transfer rate of the disc — you need 30 frames per second to do NTSC video. We can always upgrade [to 32-bit processors] in future systems.

We have plans to develop full-motion [full-screen] video for CD-I but it will take at least five years to achieve that. We will need to find ways of compressing the digital video image.

Full-motion video on demand remains the Holy Grail of home entertainment systems. The question facing CD-I is whether — in the next five years — partial-screen full-motion video is enough to engage the hearts and minds of consumers worldwide. ◘

Teldec Announces New CD Mastering System

Teldec Schallplaten BmbH, a West German record company, announced plans to introduce a new Compact Disc-Digital Audio mastering process, "DMM-CD" (Direct Metal Mastering-Compact Disc). The current standard production process employs the Sony-Philips laser optical package. The DMM process is expected to reduce both disc mastering and duplication costs. The first DMM produced discs are due out in January 1987. ***CD-I News*** will cover this important development in issue no. 4. ◘

APPLICATIONS UPDATE

Author! Author! The Status of CD-I Authoring Systems

Despite the fact that the final Green Book specifications aren't yet available, CD-I industry players continue to make significant innovative strides in authoring systems — because they can't afford to wait. (Green Book specs are due mid-February, according to Philips.)

"Everybody's idea about authoring systems is different."

Logic would dictate that the lack of finalized Green Book specifications would have brought the development of authoring tools to a standstill. The view of Roger Missimer, president of OptImage Interactive Services, on CD-I authoring systems is typical:

I wish I had a good answer [on the availability of authoring systems], he told ***CD-I News.*** *We need them to function. I think we'll probably see them in the second quarter of 1987.*

"People have no way of testing [CD-I] because the chips [for CD-I] don't exist yet," according to Jim Solomon, president of MicroTRENDS, the most visible licensee of CD-I's OS-9 Real-Time Operating System. "All of us can predict and emulate, but not even Stan Cornyn [of The Record Group] can say that what we have is 'CD-I.' It's hard to have authoring tools when you don't have a specification."

Compounding the problem further is confusion over the meaning of the phrase "authoring system" for CD-I. Bryan Brewer, president of EarthView, an interactive video production company based in Seattle, Washington addresses this issue:

Everybody's idea about authoring systems is different. Authoring systems can span a range of activities from conceptualization to storyboarding, scripting, production, and testing. A complete authoring system would do it all. It's important to understand that there are different levels of authoring systems — they mean different things to different people.

Given what Brewer terms "a difficult development environment," what have the developers been doing in anticipation of those custom chips and final Green Book specifications? Jim Solomon said that much of the important "information is at hand," and MicroTRENDS, based in Schaumburg, Illinois, has developed a product called "ColorCatcher," a so-called "video computer that has programmable personalities." This technology, according to Solomon, enables MicroTRENDS to take an image and compress it down to one-tenth or even one-fortieth of its original size.

Macromind, based in Chicago, is another company trying to leverage generic authoring systems expertise. The key to authoring, from the perspective of Macromind President Marc Canter, is coming up with "tools that are easy enough for everybody to use. You have to start with easy tools because CD-I is a mammoth endeavor."

The Macromind system, called VideoWorks Interactive (with licenses available for $500, plus an additional 30 to 60 cents charge per disc sold) is based on the relatively simple user interface of the Macintosh computer. Rather than using complex programmer-oriented commands, VideoWorks is based on visual images, "a graphic icon language" in which "events are related to the object [or icon]." According to Canter, who has years of experience in videogames:

A four-year-old should be able to learn it in twenty minutes. That's the challenge of authoring systems — to be able to view 650 megabytes on one screen. You can't do it with lists. You have to be able to step back and then zoom in and zoom out. It has to be designed for people who aren't programmers. We are trying to simplify this process.

Though CD-I was created for the world of the Motorola 68000-based microprocessor, MS-DOS-based computers can also be utilized; Aegis Development/CD-I, another vendor developing authoring systems, actually used the Atari Amiga computer to accomplish the same task.

Aegis, based in Santa Monica, California, is designing authoring tools based on past animation software. The focus of the company, according to William Volk, vice president and technical director of Aegis, is on "preventing months and months of programming" with a simple authoring system. The main thrust of the company will be on developing CD-I titles with

(continued on page 11)

APPLICATIONS UPDATE

ICT Plunges Into CD-I

"... the next important electronic publishing revolution will be in CD-I"

International Consumer Technologies, a multimedia production company based in Ann Arbor, Michigan, is staking much of its future on CD-I. Founded in May, 1986, ICT is conducting extensive focus groups and product development in CD-I.

ICT is concentrating its initial research efforts on identifying the innovators or early adopters of new technologies who are likely targets for CD-I, according to Bobby Kotick, ICT's President. Kotick believes CD-I will appeal especially to certain VCR, PC, and CD owners.

ICT is currently examining applications of CD-I in sixteen "product families," such as learning languages, and plans to develop product in eleven of these application areas.

According to Kotick, ICT's market testing is aimed at determining "how people interact with [CD-I] data, and whether this kind of data has enough entertainment and educational value to make people want to buy CD-I programs." In addition, ICT's research will look into user reaction to "the different configurations of CD-I, and the different input devices that might be used in CD-I — like keyboards."

ICT is creating storyboards and undertaking other production work on CD-I prototype discs. It plans to come out with a CD-I simulation trivia game called Trivial Pursuit around January 1987, and hopes to commence production on commercial CD-I discs by the end of 1987. ICT is working with video publishers, print publishers, and audio producers on its CD-I projects, and is close to entering into a joint venture with a Los Angeles audio/video production company to produce CD-I discs.

ICT may also adapt "passive video projects" to CD-I that are found to be complementary with the medium. For instance, a short videotape guide ICT produced on Ivy League schools may be adapted to CD-I.

The production costs for ICT's CD-I prototypes run around $30,000, "depending on the complexity of the audio and video data used," says Kotick. The production teams working on the CD-I prototypes at ICT typically range between four to thirteen people. One CD-I simulation at ICT which Kotick calls "perfect for CD-I" is A Night at the Golden Nugget, which includes slot machines, poker, blackjack, and other games. He notes that the disc "has a story behind it," and provides instructions on playing poker and other games for those unfamiliar with the games.

ICT is also planning to set up a computer-integrated creative design (CICD) team for CD-I, and believes that the networking of creative design workstations holds "huge potential" in interactive media. CICD would electronically link graphic designers, video producers and other key creative people working in interactive media. According to Kotick, this process would lead to considerable savings in production costs.

Kotick sees "exponential growth for CD-I," and feels that "the next important electronic publishing revolution will be in CD-I." He believes CD-I will benefit greatly from the high level of consumer awareness and success of VCRs, compact discs, and PCs.

Clearly, ICT is taking a big gamble devoting much of its resources to CD-I. Nevertheless, ICT's approach to CD-I underlines the importance of closely coordinated and comprehensive marketing and production operations in CD-I. Without this kind of concerted effort, CD-I will languish in the consumer electronics basement. □

Author! Author! ... (continued from page 10)

"a series of authoring tools" as a by product of that process.

CD-I authoring systems have begun to attract innovative developers from the personal computer, videogame, CD-ROM, and interactive videodisc industries. Given the uncertainty bound to prevail until the CD-I chips and final specifications are available, the industrious activity of these and other vendors is encouraging news for the CD-I industry. □

Places to Be...

CD-I: BIRTH OF A BILLION-DOLLAR INDUSTRY

January 11-13, 1987
Sheraton Sands Key
Clearwater, Florida

The fourth in a series of Institute for Graphic Communications conferences on optical technology will focus on CD-I. The conference will examine CD-I technology, applications and marketing. Speakers will include John Missimer (OptImage), John O'Brien (Laserland), and Philips representatives.

Institute for Graphic Communications
375 Commonwealth Avenue
Boston, MA 02175
(617) 267-9425

$725

INFORMATION INDUSTRY ASSOCIATION — Annual High Tech Marketing Conference

February 12-14, 1987
Boca Raton Hotel and Club
Boca Raton, Florida

This conference will focus on innovation in technology for the mass market. The keynote dinner address will be delivered by David Geest, senior managing director and chairman, Philips Corporate Group - Home Interactive Systems.

Information Industry Association
555 New Jersey Avenue, N.W.
Suite 800
Washington, DC 20001
(202) 639-8262

$345 for IIA members; $445 for non-members

MICROSOFT'S SECOND INTERNATIONAL CONFERENCE ON CD-ROM TECHNOLOGY

March 3-5, 1987
Seattle Sheraton
Seattle

This conference "will focus on product development, application design, and publishing" in CD-ROM.

Microsoft
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073
(206) 882-8080

CD-I: THE FUTURE — Business Conference and Exhibition

May 11-13, 1987
Moscone Center
San Francisco

This conference will address a broad range of CD-I marketing, product development and technical issues.

Online International Inc.
989 Avenue of the Americas
New York, NY 10018-5485
(212) 279-8890

INTERNATIONAL CONFERENCE ON INTERACTIVE MEDIA

June 2-3, 1987
Eindhoven
Netherlands

This conference will focus on interactive videodiscs and CD-I. A LaserVision Award will be presented.

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